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HABBUL QIL-QIL -*Cardiospermum halicacabum Linn*, A benificial plant with a contraversy in its identity: A Unani Medicine Review

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Abstract
This review article is an attempt to explore the identity, origin and history of use of Habbul qil-qil (Cardiospermum halicacabum) in Unani system of medicine and to establish the fact that the drug is in fact a part of the rich documentation of the Unani system of medicine. It also recapitulates the action and uses of Habbul qil qil mentioned in Unani classical literature along with the morphology, phytochemistry and pharmacological aspects to provide a direction for further research. The review reveals that the plant, as part of folk medicine, has been used by Unani Physicians as Aphrodisiac (muqavvi-e- bah) medicine in compound preparation , As well as Adipogenous (musammin-e- badan) Further, this review article suggests that Cardiospermum halicacabum has many phytochemical constituents for example; carbohydrate, protein, lipids, saponins, tannins, flavonoids,alkaloids, glycosides, and steroids . Addition to activities like antiinflammatory , antidiabetic ,anxyolitic ,anticonvulsant, anti cancer ,antioxidant, etc.

Keywords: Cardiospermum halicacabum *Linn.* , Hbbul qil qil ,Unani Medicine.

Introduction :Cardiospermum halicacabum *Linn.*.; Family Spindaceae, is a climber, which grows wild everywhere in the plains of India.This plant is extensively dispersed in tropical and subtropical areas of the world. This plant is produced in the plains of Africa, America, Bangladesh, India, and Pakistan . It is mentioned in some unani classical literature that this plant , Habbul qil qil is native of Iraq according to unani classical literatures, widely used by rural communities of India and mostly all over the globe since ancient times.It is cultivated along the fields of cotton plants,it almost looks like a grape vine, with tendrils to hold on the support and white cotton like flower ,it has been used for the treatment of various ailments all over India ,it is used by common people for White urine, Diarrhoea and Snakebite . This medicine is used by the traditional systems of medicine . It is also used in leucorrhoea according to one of the literatures.The use of Habbul qil qil as a aphrodisiac and adipogenous and antiseptic medicine is mentioned in the classical literature of unani medicine..

Cardiospermum halicacabum Linn. (C. halicacabum) is one of the well-known leafy green vegetables in India. It is an herbaceous climber from the Sapindaceae family which is found in almost every Continent and Oceania. In the traditional Indian medicine systems, this plant is used for the treatment of rheumatism, abdominal pain, orchitis, dropsy, lumbago, skin diseases, cough, nervous disorders, and hyperthermia.Halicacabum is derived from a greek word meaning salt barrel refers to the rotund fruits,

the German word Balloonrebe ,in english balloon vine refers to the swollen looking flowers.
Now a days, herbal medicines play a major role in health-care programs in developing countries. Around 80% of world population still depends on medicinal plants for their primary health-care needs . India is recognized as a land of herbal plants; hence, any specific data on such plants could be of clinical importance .*C. halicacabum* Linn. belongs to family Sapindaceae. Common name is Balloon vine. Tamil name Mudakkathan. Annual climber stems with minutely puberulous, tendrils present. Leaves biternate, essentially trifoliate with each part divided again into 3 leaflets, leaflets with coarse serrate teeth. Flowers in the axillary heads usually 3 flowered by abortion, white with a yellowish center. Fruit a membranous, inflated capsule, green, drying to brown more than 2 cm long. Round and black seeds with a broadly heart-shaped or kidney-shaped spot , the seeds are bright in colour ,sweet taste and a nutmeg inside ,larger than kernels of sorghum ,resembling lobia seeds .This plant is extensively dispersed in tropical and subtropical areas of the world. This plant is produced in the plains of Africa, America, Bangladesh, India, and Pakistan .For several centuries, the whole plant has been used for treatment of rheumatism, stiffness of limbs, snake bite, its root for nervous diseases, as a diaphoretic, diuretic, emetic, emmenagogue, laxative, refrigerant, stomachic, and; its leaves and stalks are used in the treatment of diarrhea, dysentery, and headache and used as a poultice for swellings . It is used for the treatment of skeletal fractures in Srilanka . Various products such as gel, cream, shampoo, and spray of *C. halicacabum* is available in market. These products are useful for dry itchy skin and scalp . Many studies show extract of *C. halicacabum* has pronounced anticarcinogenic activity also.


fruit

seeds

Taxonomy

KINGDOM	-Plante-plants
Subkingdom	-Tracheobionata-Vascular plants
Superdivision	-Spermatophyta-Seed plant
Division	-Magnoliophyta -Flowering plants
Class	-Magnoliopsida-Dicotyledons
Subclass	- Rosidae
Order	-Spindales
Family	-Spindaceae juss -Soap berry family
Genus	-Cardiospermum L. -balloon vine
Species	-Cardiospermum halicacabum L. -balloon vine

flower

Common names/ vernacular names

Assamese -Kapal phuta
Kopal -phuta-bon
Bengali - Lataphatkari
English -Balloon vine
-Balloon vine heart seed
- Blister creeper
- Heart seed
- Hearts pea
Hindi - Kanphata
- Kanphuti
-Kapalphodi
Kannada -Agniballi
-Bekkinatoddinaballi
-Erumballi
- Kakaralata
Malayalam-Jyotishmati
-Karavi
-Karuthakunni
-Katabhi
-Paluruvam
-Ulincha
-Uzhinja
-Valiuzhinja
Marathi -Kakumardanika
-Kanphuti
- Shibjal

Nepali -Jyotismati
Oriya -Sakralata
Sanskrit -Bunu-uchchhe
-Jyotishmati
-Indravalli
Tamil - Kottavan
-Modikkottan
-Mudakattan
Telugu -Buddakakara
-Ekkudutige
-Jyotishmatitige
-Kasaritige


Fruit with seeds

TEMPERAMENT:HOT AND WET

Geographical distribution

C. halicacabum is a common plant in tropical and subtropical regions throughout the world. It is widespread in South Africa and North American countries (Antigua and Barbuda, Barbados, Dominica, Grenada, Guadeloupe, Martinique, Montserrat, Netherlands Antilles, Saint Kitts, and Nevis, Saint Lucia, Saint Vincent, and the Grenadines). Moreover, *C. halicacabum* has broad occurrence in several Asian countries , South African countries , European countries , and North American.

Part used: seeds and leaves and root

PHYTOCHEMICAL CONSTITUENTS

Phytochemical analysis of the *C. halicacabum* showed presence of
carbohydrate, protein, lipids, saponins, tannins, flavonoids, alkaloids,
Glycosides , and steroids .
Gas chromatography - mass spectrometry analysis of this plant extract revealed presence of many active compounds in *C. halicacabum* such as 1,2,4-trioxolane- 2-octanic acid, 5-octyl-methyl ester, ethanol, 2-

[9-octadecenyloxyl],
1,2,4-Trioxolane-2-octanic acid, 5 octyl methyl ester, ricinolenic acid, [1,1bicyclopopyl]-2-octanic acid, 2-hexyl-methyl ester, 11-octadecenoic acid, methyl ester, 7-methyl-7tetradecan-1-ol acetate, oleic acid, 9-octadecenoic acid, 1,2,3-propanetriyl ester . (+)- pinitol, βsitosterol, βsitosterol-β-o-glactoside, apigenin-7-o-glucuronide,
arachidic acid, chryoerior-7-o-glucuronide, linoleic acid, luteolin-7-o-glucuronide, and stearic acid

THERAPEUTIC USES

Because of the presence of various chemical constituents, extract of this plant showed various medicinal properties such as antibacterial, antifungal, antiparasitic, antidiarrhoeal, anxiolytic, rubifacient,antipyretic, anti-inflammatory, anticonvulsant, and anticarcinogenic.

Antibacterial activity

In recent years, the rate of infection and resistant against antibiotics has been increased. The presence of antibacterial substances in the plant show good antibacterial activity without producing any side effects. Antibacterial activity of *C. halicacabum* Linn. was investigated by well diffusion technique (Farrukh *et al*., 2008) against the selected human pathogens. This extract showed varying degrees of inhibition zones against Gram-positive bacteria *Staphylococcus aureus*, *S. aureus* AB 188, *Staphylococcus epidermis, Streptococcus pyogenes*, *Streptococcus fecalis, Bacillus subtilis, Bacillus cereus, Bacillus steadher, Micrococcus luteus, Corynebacterium hofmanu,* and *Pnemococci*) and Gram-negative bacteria (*Shigella boydii, Shigella dysenterae,Salmonella typii, Salmonella paratyphii* A, *Salmonella parathypii* B, *Shigella flexneri*, *Proteus flexneri, Proteus mirabilis, Proteus vulgaris, Escherichia coli, Klebsiella pneumonia, Enterobacter,* and *Pseudomonas aeroginosa*) .

Antifungal activity

Antifungal activity of plant extract was carried out according to Mahmud *et al*., 2009 by agar dilution method. The extract of *C. halicacabum* Linn. showed significant antifungal activity against human pathogens (*Aspergillus niger, Candida albicans*), animal pathogens (*Microsporillum gypsiccus*, *Trichophyton mentagrophyte*) and plant pathogens
(*Saccharomyces cerevisiae, Penicillium* sp.)

Antiparasitic activity

Extracts of *C. halicacabum* were tested in *in vitro* for their effectiveness against third-stage larvae of *Strongyloides stercoralis*. This is an important parasitic nematode which persists for years in the human host and it may disseminate and cause fetal infection. Aqueous extract of *C. halicacabum* exerted more rapid effect on larval motility than that
of the alcohol extract. To attain 50% non motility or dead it took <24 hrs and more than 36 hrs for aqueous and alcohol extract of *C. halicacabum*, respectively .

Anti-inflammatory activity

λ-Carrageenan hind paw edema model was used for determination of anti-inflammatory activity . The L-arginine-NO pathway has been proposed to play an important role in the carr-induced inflammatory response. The expression of inducible isoform of NO
synthase is an important mediator of inflammation. Therefore, the NO level has been increased during inflammation.Tumor necrosis factor (TNF-α) is a major mediator in inflammatory responses. It induces innate immune responses by activating T cells
and macrophages and increase the secretion of other inflammatory cytokines .The ethanolic extract (100,

200, and 400 mg/kg) significantly decreased the NO level in serum and TNF-α level in serum after 5 hrs of post-Carr injection [13]. By inhibiting the NO and TNF-α production, *C. halicacabum* expressed its anti-inflammatory activity .

Extract of *C. halicacabum* Linn. contained rutin. Rutin is a flavonol glycoside comprised flavonol quercetin and the disaccharide runinose. Rutin was shown to increase the colonic glutathione level, thus reducing oxidative tissue damage and thus reduce the inflammation .

Antioxidant activity

Reactive oxygen species affects various molecular components of the cell such as fatty acids, proteins, and DNA. An excess production of reactive oxygen species leads to cell degeneration and death . Methanolic extract of *C. halicacabum* exhibited inhibition of 2,2-diphenyl-1- picrylhydrazyl radical and possessed reducing power, superoxide
scavenging ability, nitric oxide scavenging activity, and ferrous ion chelating potency . Large quantities of phenolic compounds in *C. halicacabum* extract makes it a strong free radical scavenger, which indicates that the extract has good potential as a source for natural antioxidants to prevent free radical-mediated oxidative damage .

Antipyretic activity

Antipyretic activity of the *C. halicacabum* Linn. extract was studied in rat models. For this, pyrexia was induced by pyrogen administration. Ethanolic and n-hexane extract of the *C. halicacabum* showed significant antipyretic activity at a higher dose of 400 mg/kg. The efficacy of 100 mg/kg paracetamol was almost equal to that of 400 mg/kg of the
extract .

Antidiarrhoeal activity

Diarrhea is a very common and major national problem in many tropical countries which results in 4-5 million deaths throughout the world annually . Diarrhea was induced by castor oil to the animal models. The alcoholic and aqueous extract of the *C. halicacabum* exhibited the anti diarrhoeal activity against the castor oil induced
diarrhea by reducing the frequency of defecation and decrease the intestinal secretion .

Antiarthritic activity

Rheumatoid arthritis is an autoimmune disease which results in a chronic, systemic inflammatory disorder that causes pain, swelling stiffness, and loss of function in joints . Liquid chromatography – mass spectrometry analysis of *C. halicacabum* indicated the presence of anti-inflammatory compounds Luteolin-7-o-glucuronide, Apigenin-
7-o-glucuronide, and Chrysoeriol . Extract of the *C. halicacabum* exhibited therapeutic effects against Freund's complete adjuvant induced arthritis in rat models by decreasing the production of proinflammatory cytokines such as TNF-α, interleukin-1 and
inhibition of protein denaturation, membrane stabilization and proteinase inhibition .

Anxiolytic activity

The state of anxiety involves disturbances in coordination of different eurotransmitters, for example, gamma amino butyric acid (GABA), serotonin, noradrenalin, dopamine, opoid peptides, endocannabinoids, corticotrophin-releasing hormone, neuropeptide Y,
and oxytocin in various brain pathways . GABA is a major inhibitory neurotransmitter in the central nervous system and activation of GABAA receptors results in significant increase in chloride conductance across the cell membrane which causes neuronal failure to generate an action potential and leads to inhibition. *C. halicacabum* extract has various bioactive compounds such as flavonoids, sterols, triterpenoids, saponin , tannins, and xanthoproteins . Anxiolytic activity of the extract may be due to

binding of any of these phytochemicals to the GABAA BZDS complex .

Antidiabetic activity

Diabetes mellitus is a metabolic disorder which is characterized by a loss of glucose homeostasis with disturbances of carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion or insulin action or both. Management of diabetes without any side effect is still challenge to the medical community . Antihyperglycemic
effect of ethanolic extract of *C. halicacabum* leaf was examined against streptozotocin-induced diabetic rats. This extract has several flavonoids such as apigenin, pinitol, and luteolin which are reported as the antidiabetic principles . This extract showed significant antihyperglyceamic activity at the dose of 200 mg/kg by decreasing the plasma glucose and HbA1 C and increasing the level of insulin and hemoglobin. This extract increased the activity of glucokinase and decreased the activity of glucose 6 phosphatase and fructose 1,6 phosphatase in the liver . Thus, this extract showed antidiabetic activity .

Anticonvulsant activity

Alcoholic extract of the petroleum ether fraction of *C. halicacabum* in the dose of 350 mg/kg body weight was effectively reduced the extensor and flexor component of tonic

Neuroprotective role:

Dementia is a progressive brain dysfunction which leads to a gradually increasing restriction of daily activities. It is characterized by difficulties in memory, disturbances in language, psychological and psychiatric changes, and impairment in routine activities. Methanolic extract of *C. halicacabum* potentially improved memory and reversed amnesia induced by administration of scopolamine. It also significantly decreased the whole brain acetyl cholinesterase activity .

Anticancer activity

Cancer is a second major cause of deaths after cardiovascular diseases. The available anticancer therapies not only kill the cancer cells but kill the normal cells also . Due to the presence of phytocompounds, the extract of *C. halicacabum* showed anticancer ctivity. Methanolic extract of the *C. halicacabum* showed remarkable anticancer potential against the breast cancer cell lines . Chloroform extract of *C. halicacabum* Linn. showed significant anticancer activity against Ehrlich Ascites carcinoma cell line . Methanolic extract of *C. halicacabum* has profound effect in controlling Hep-G2 cell proliferation at lower concentration . Evaluation of cytotoxic activity of *C. halicacabum*
using MTT assay revealed that *C. halicacabum* extract is a potential material for the treatment of cancer
.

CONTRAVERSIAL FINDINGS IN ITS IDENTIFICATON:

According to few authors Habbul qil qil has been identified as Anar dashti,which means jangli anar,which is quite different from habbul qil qil. Anar dashti belongs to different family,it's a wild variety of pomegrante.In one of the literature it is mentioned as Gawarchakna ,which means Cyamopsis tetragonoloba,it is a legume (gawar phalli).

In few literatures it has been mentioned as this medicinal plant has got the seeds which are bitter In taste and unplesant to smell, while few other books mention that its seeds are very tasty and consumed with very much appreciation.

In a classical literature muheete azam it is mentioned as native of Iraq.

Conclusion

C. halicacabum Linn. has enormous medicinal value which is used to treat simple ailments to chronic diseases because of presence of their bioactive phytochemical constituents. This review throws light on the bioactivity potential of this easily available plant which may be
beneficial to the societyIt is a useful medicinal plant described by Unani physicians which

is also ethnomedicinally used as a therapeutic agent for a variety of diseases in traditional systems of medicine and folklore. Numerous research works on Habul qil qil have proved its uses in experimental animals. Phyto-constituents from this plant are responsible for its pharmacological activities. Therefore, cultivation, collection and further clinico- pharmacological exploration of Habul qil qil are essential. The plant possesses many phytochemical constituents which are responsible for its benificial activities. C.halicacabum is one of the widely consumed green leafy vegetables as well as a well-documented medicinal plant in the Indian traditional system of medicines. It is also implemented for various remedial purposes in other parts of the world including China, Sri Lanka, Africa, and Thailand . All parts of this plant are usually consumed as food as well as medicine. In south India, especially in the Tamil cuisine, pureed leaves are eaten along with rice porridge, spongy lentil.

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